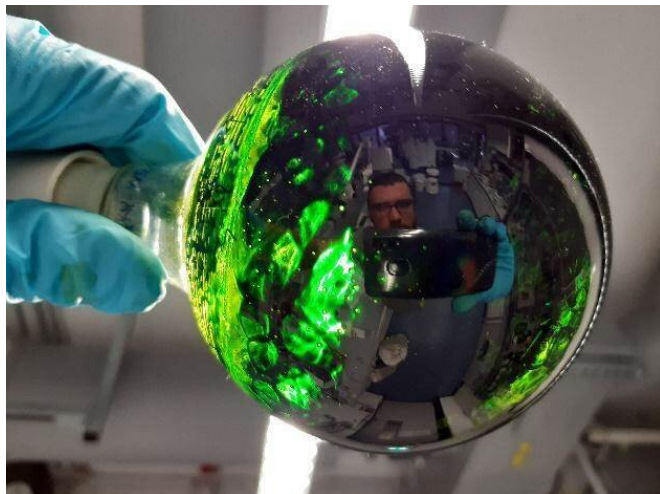


Extracts of the plant *A. annua* are active against SARS-CoV-2

25 June 2020



A flask containing ethanolic *A. annua* plant extract.
Credit: Dr. K. Gilmore

Chemists at the Max Planck Institute of Colloids and Interfaces (Potsdam, Germany) in close collaboration with virologists at Freie Universität Berlin have shown in laboratory studies that aqueous and ethanolic extracts of specially bred sweet wormwood plants (*A. annua*) are active against the new coronavirus that has caused the COVID-19 pandemic. Human clinical trials to test the efficacy of both teas and coffee containing *A. annua*s well as the anti-malaria drug artesunate are about to begin at the University of Kentucky's academic medical center.

For millennia, herbal folk medicines in Asia, Africa, and South America have been used to treat infectious diseases. Extracts of *A. annua* [plants](#) have been successfully employed to treat febrile diseases including malaria. Artemisinin is extracted from this plant and is the basis for the WHO-recommended anti-malaria combination therapies used in millions of adults and children each year with few, if any, side effects.

The use of *A. annua* teas as malaria treatment is promoted as a natural combination therapy against infections, although the WHO strongly discourages their use amid concerns about the development of malaria drug resistance. We set out to determine whether *A. annua* extracts—pure artemisinin and related derivatives, and mixtures thereof—may be active against the COVID-19 virus. These drugs would be attractive candidates for repurposing considering they have excellent safety profiles and are readily available, rapidly scalable, and are relatively inexpensive.

"Having worked with compounds derived from *A. annua* plants, I was familiar with the interesting activities of the plants against many different diseases, including a range of viruses. Therefore, we felt that exploring the activity of this plant against COVID-19 was worth the undertaking," says Prof. Peter H. Seeberger who initiated and oversaw the study together with Dr. Kerry Gilmore.

Plant extracts inhibit viral plaque formation

A. annua leaves from a cultivated seed line grown by ArtemiLife Inc. in Kentucky, U.S., when extracted with absolute ethanol or distilled water, provided the best antiviral activity. The addition of either ethanolic or aqueous *A. annua* extracts prior to virus addition resulted in significantly reduced plaque formation. The ethanolic extract of both *A. annua* and coffee was found to be most active. However, artemisinin alone does not present much antiviral activity.

"I was surprised to find that *A. annua* extracts worked significantly better than pure artemisinin derivatives and that the addition of coffee further enhanced the activity," says Klaus Osterrieder, professor of virology at Freie Universität Berlin who conducted all activity assays.

Human clinical trials using teas and coffees about to begin in Kentucky

To test the activity of *A. annua* extracts, COVID-19 [human clinical trials](#) with teas and coffees containing *A. annua* leaves provided by ArtemmiLife Inc. are about to begin at the University of Kentucky's academic medical center. In addition, artesunate, an artemisinin derivative used to treat malaria will be used in a Phase 1/2 clinical trial as well.

"The University of Kentucky and UK Markey Cancer Center are delighted to continue our collaboration with ArtemiLife to study this Kentucky-grown *A. annua* as a potential treatment for patients with COVID infections," said Jill Kolesar PharmD, co-leader of the Drug Development Program at Markey Cancer Center and professor in the University of Kentucky College of Pharmacy.

More information: Gilmore et al. *Artemisia annua* Plant Extracts are Active Against SARS-CoV-2 In Vitro, (2020). submitted for publication.

Provided by Freie Universitaet Berlin

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